producing a parallel electric field to the first insulating substrates, said parallel electric field being generated between the first and second electrodes, and

A4 Cont.

driving the liquid crystal material by the parallel electric field,

wherein the liquid crystal material is oriented in a hybrid alignment nematic mode.

REMARKS

In view of the foregoing amendments and the following remarks, reconsideration and allowance are requested.

Claims 1-24 remain pending with claims 1, 7, 13 and 19 being independent. Claims 1, 2, 7, 8, 13, 14 and 19 have been amended. In particular, independent claims 1, 7, 13 and 19 have been amended to recite that the liquid crystal material is oriented in a hybrid alignment nematic (HAN) mode. Support for this amendment can be found in the specification and figures at least at page 13, line 14 to page 14, line 3.

For the reasons set forth at page 2 of the office action, claims 1-24 stand rejected under the doctrine of obviousness-type double patenting over claims 1-26 of U.S. Patent No. 6,160,600 ("the '600 patent"). This rejection is traversed.

The claims of a pending application can be rejected under the doctrine of obviousness-type double patenting only if the

pending claims would have been obvious from the claims of the patent in question. Such is not the case here. Specifically, it is noted that claims 1-23 of the '600 patent are directed to a reflective type liquid crystal display (LCD) device whereas rejected claims 1-24 are directed to a method of driving a reflective type LCD device. It is well-settled that mere recitation of an apparatus does not in and of itself render obvious a method for using (or in this case, driving) that apparatus. Accordingly, because nothing in claims 1-23 of the '600 patent suggests the method of driving the reflective LCD device as recited in rejected claims 1-24, the obviousness-type double patenting rejection is improper and must be withdrawn.

Moreover, although claims 24-26 of the '600 patent are directed to a method of driving a reflective type LCD, they do not recite or suggest orienting liquid crystal material in a HAN mode, as recited in each of rejected independent claims 1, 7, 13 and 19. Claims can be deemed obvious variants of prior claims only if each and every element is taught or suggested by the prior claims. Here, the Examiner is rejecting claims 1-24 as being obvious variants of claims 1-26 in the '600 patent "because they contain common subject matter such as the interlayer insulating layer covering first and second TFTs and being a multi-layer film of SiN and SiO." Office action at 2. However, mere similarity or some level of overlap among claims

is not sufficient basis to support an obviousness-type double patenting rejection. Accordingly, the obviousness-type double patenting rejection of claims 1-24 is improper and must be withdrawn for this additional reason.

For the reasons set forth at pages 3-4 of the office action, claims 1, 3-7, 9-13, 15-19 and 21-24 stand rejected variously under 35 USC 102(e) and/or 103(a) as allegedly being unpatentable over or more of Hirakata (USP 5,977,562), Ota (USP 6,108,065), and Misawa (USP 5,250,931). (Claims 2, 8, 14, and 20 have not been rejected under statutory grounds.) These rejections and their underlying rationale are traversed.

Initially, it is noted that Hirakata is not prior art to this application under 35 USC 102(e) because this application is entitled to a foreign priority date of November 17, 1995. Hirakata's U.S. filing date is November 14, 1996, well after this application's foreign priority date.

As noted above, each of independent claims 1, 7, 13 and 19 has been amended to recite a method of driving a reflective type LCD device wherein the liquid crystal material is oriented in a hybrid alignment nematic (HAN) mode. The cited references - Hirakata, Ota and Misawa, whether taken alone or in hypothetical combination - fail to disclose or suggest at least this feature.

Orienting liquid crystal material in a HAN mode may provide several advantages such as those described in the specification. For example, when a liquid crystal display device is operated in the parallel electric field (in-plane switching "IPS"), the aperture ratio typically is inferior because the electrode for generating the electric field should be formed over a same substrate. Therefore, it is preferable for a transmittance type liquid crystal display device that a strong backlight is equipped in the display device. As a result, the power consumption may be poor. On the other hand, if the liquid crystal display device operated in the IPS is a reflective type, then it typically is unnecessary to locate a backlight in the display device. Thus, power consumption of the reflective type typically is better than that of the transmittance type.

In addition, in a case that IPS is utilized, a switching speed of a liquid crystal molecule may be slow. However, because the response speed of liquid crystal molecules in the HAN mode is high (see, e.g., the specification at page 17, lines 9-19), it generally is advantageous for the reflective type liquid crystal display device to be driven in the higher operation speed.

Accordingly, the independent claims are allowable at least for the foregoing reasons. Each of the remaining claims depends directly or indirectly from one of the independent claims

discussed above. Accordingly, these dependent claims are allowable for the reasons that their respective independent claims are allowable and for reciting allowable subject matter in their own right. Independent consideration and allowance of the dependent claims are requested.

Attached is a marked-up version of the changes being made by the current Response.

Applicant asks that all claims be allowed. Please apply any charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

Date: July 30, 2001

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Version with markings to show changes made

In the claims:

Claims 1-2, 7-8, 13-14, and 19 have been amended as follows:

1. (Amended) A method of driving a reflective type liquid crystal display device,

said reflective type liquid crystal display device comprising:

a first insulating substrate;

a second insulating substrate being disposed opposite to the first insulating substrate;

a first electrode being formed over the first insulating substrate;

a second electrode being formed over the first insulating substrate;

a liquid crystal material being interposed between the first and second insulating substrates;

said method comprising the steps of:

producing a parallel electric field to the first insulating substrates, said parallel electric field being generated between the first and second electrodes, and

driving the liquid crystal material by the parallel electric field,

wherein the liquid crystal material is oriented in a hybrid alignment nematic mode.

2. (Amended) A method according to claim 1, [wherein the liquid crystal display device is a reflective type liquid crystal display device,]

said reflective type liquid crystal display device comprising:

the first insulating substrate having transparency;

a reflecting layer;

at least a part of said second insulating substrate covering the reflecting layer;

a first conducting line for applying electrical signals to the first electrode, said first conducting line being formed over the first insulating substrate;

a first thin film transistor formed over the first insulating substrate as a switching element and electrically connected to the first electrode and the first conducting line,

said first thin film transistor comprising:

a crystalline semiconductor island formed over the first insulating substrate;

source and drain regions formed in the crystalline semiconductor island;

a gate electrode formed adjacent to the crystalline semiconductor island having a gate insulating film therebetween,

a pair of low concentration regions each being adjacent to the source and drain regions in the crystalline semiconductor island;

an interlayer insulating film covering the first thin film transistor, said interlayer insulating film being a multilayer film of silicon oxide and silicon nitride;

the second electrode being electrically insulated from the first electrode and from the first conducting line; and

a second conducting line for applying electrical signals to the second electrode, said second conducting line being formed on the first insulating substrate,

wherein the liquid crystal material is operated by a parallel electric field to the first substrate, said parallel electric field being generated between the first and second electrodes[,

wherein the liquid crystal material is oriented in a hybrid alignment nematic mode].

7. (Amended) A method of driving a reflective type liquid crystal display device,

said reflective type liquid crystal display device comprising:

a first insulating substrate;

a second insulating substrate being disposed opposite to the first insulating substrate;

a first electrode being formed over the first insulating substrate;

a first thin film transistor being formed over the first insulating substrate as a switching element;

a second thin film transistor formed over the first insulating substrate for driving the first thin film transistor;

a second electrode being formed over the first insulating substrate;

a liquid crystal material being interposed between the first and second insulating substrates;

said method comprising the steps of:

producing a parallel electric field to the first insulating substrates, said parallel electric field being generated between the first and second electrodes, and

driving the liquid crystal material by the parallel electric field,

wherein the liquid crystal material is oriented in a hybrid alignment nematic mode.

8. (Amended) A method according to claim 7, [wherein the liquid crystal display device is a reflective type liquid crystal display device,]

said reflective type liquid crystal display device comprising:

the first insulating substrate having transparency;

a reflecting layer;

at least a part of said second insulating substrate covering the reflecting layer;

a first conducting line for applying electrical signals to the first electrode, said first conducting line being formed over the first insulating substrate;

the first thin film transistor being electrically connected to the first electrode and the first conducting line;

said first thin film transistor comprising:

a crystalline semiconductor island formed over the first insulating substrate;

source and drain regions formed in the crystalline semiconductor island;

a gate electrode formed adjacent to the crystalline semiconductor island having a gate insulating film therebetween,

a pair of low concentration regions each being adjacent to the source and drain regions in the crystalline semiconductor island;

an interlayer insulating film covering each of the first and second thin film transistors, said interlayer insulating film being a multilayer film of silicon oxide and silicon nitride;

a second electrode formed over the first insulating substrate and electrically insulated from the first electrode and from the first conducting line;

a second conducting line for applying electrical signals to the second electrode, said second conducting line being formed over the first insulating substrate;

a biaxial film disposed over the first insulating substrate; and

a polarizing plate disposed on the biaxial film,

wherein the liquid crystal material is operated by a parallel electric field to the first substrate, said parallel electric field being generated between the first and second electrodes[,

wherein the liquid crystal material is oriented in a hybrid alignment nematic mode].

13. (Amended) A method of driving a reflective type liquid crystal display device,

said reflective type liquid crystal display device comprising:

a first insulating substrate;

a second insulating substrate being disposed opposite to the first insulating substrate;

a first electrode being formed over the first insulating substrate;

a first thin film transistor being formed over the first insulating substrate as a switching element;

a second thin film transistor being formed over the first insulating substrate for driving the first thin film transistor;

an interlayer insulating film covering each of the first and second thin film transistors;

a second electrode being formed over the first insulating substrate;

a liquid crystal material being interposed between the first and second insulating substrates;

said method comprising the steps of:

producing a parallel electric field to the first insulating substrates, said parallel electric field being generated between the first and second electrodes, and

driving the liquid crystal material by the parallel electric field,

wherein the liquid crystal material is oriented in a hybrid alignment nematic mode.

14. (Amended) A method according to claim 13, [wherein the liquid crystal display device is a reflective type liquid crystal display device,]

said reflective type liquid crystal display device comprising:

the first insulating substrate having transparency;

the second insulating substrate having a reflecting layer thereon;

a first conducting line for applying electrical signals to the first electrode, said first conducting line being formed over the first insulating substrate;

the first thin film transistor being electrically connected to the first electrode and the first conducting line;

said first thin film transistor comprising:

a crystalline semiconductor island formed over the first insulating substrate;

source and drain regions formed in the crystalline semiconductor island;

a gate electrode formed adjacent to the crystalline semiconductor island having a gate insulating film therebetween,

a pair of low concentration regions each being adjacent to the source and drain regions in the crystalline semiconductor island;

the second thin film transistor including an n-channel third thin film transistor and a p-channel fourth thin film transistor being connected to each other;

the interlayer insulating film being a multilayer film of silicon oxide and silicon nitride;

the second electrode being electrically insulated from the first electrode and from the first conducting line; and

a second conducting line for applying electrical signals to the second electrode, said second conducting line being formed over the first insulating substrate,

wherein the liquid crystal material is operated by a parallel electric field to the first substrate, said parallel electric field being generated between the first and second electrodes, and

wherein the liquid crystal material has a first orientation near the first insulating substrate while the liquid crystal material has a second orientation near the second

insulating substrate, said second orientation being different from the first orientation.

19. (Amended) A method of driving a reflective type liquid crystal display device,

said reflective type liquid crystal display device comprising:

a first insulating substrate;

a second insulating substrate being disposed opposite to the first insulating substrate;

a reflecting layer on the second insulating substrate;

a first electrode being formed over the first insulating substrate;

a second electrode being formed over the first insulating substrate;

a liquid crystal material being interposed between the first and second insulating substrates;

said method comprising the steps of:

producing a parallel electric field to the first insulating substrates, said parallel electric field being generated between the first and second electrodes, and

driving the liquid crystal material by the parallel electric field,

wherein the liquid crystal material is oriented in a hybrid alignment nematic mode.